# CHEM-BIO DEFENSE
Quarterly

Vol. 7 No. 2



## One Mission, One Team


Cover Photo: Industry photo courtesy of Shutterstock. Warfighter photo: U.S. Army Staff Sgt. Henry Flores III, with 2nd Battalion, 8th Infantry Regiment, 2nd Brigade Combat Team, 4th Infantry Division, provides security as soldiers patrol Diwaniyah, Iraq, to assess area markets and residents' needs on Nov. 13, 2008. DoD photo by Senior Airman Eric Harris, U.S. Air Force. (Released)

Back Cover: Industry and Warfighter photo courtesy of Shutterstock.

*U.S. Air Force airman assigned to an explosive ordinance disposal unit controls a robot from a remote vehicle near a road bomb found south of Babus village in the Pul-e Alam district in Logar province, Afghanistan, June 29, 2010.*
*U.S. Army photo by Spc. Theodore Schmidt.*

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# From the JPEO-CBD


***Brig. Gen. Jess Scarbrough***
***Joint Program Executive Officer for***
***Chemical and Biological Defense***

This issue of the Chem-Bio Defense Quarterly recognizes the critical partnerships between the Joint Program Executive Office (JPEO-CBD) and its industry partners. Given the proliferation of the threat, the development of chemical, biological, radiological and nuclear defense capabilities is very much a team sport. Special thanks to our partners across the federal government and throughout the Department of Defense for collaborating to provide the men and women of the armed forces, and the people of our nation, the best defensive capabilities in the world.

We, the JPEO-CBD and our partners, are dedicated to exploiting every opportunity to collaborate with others throughout the world to ensure the best technology and expertise provide capabilities to meet the needs of the armed forces and the nation. As an organization, we are aware of the responsibilities we bear and we intend that our every action be completely transparent to our customers and partners. Our public website, http://www.jpeocbd.osd.mil, and our participation in social media outlets provides an open line of communication for small and large businesses, members of the academic community, and contractors to make us aware of new technology and products available. Also, our Future Acquisition Directorate, 703-681-9600, schedules briefings to share new chemical, biological and nuclear defense related technologies. Additionally, we, and our nine joint project managers, host industry days and advanced planning briefings to industry, provide representatives and a display at many major U.S. and international chemical, biological, radiological and nuclear defense conferences. Our next advanced planning briefing to industry is scheduled for September 8 and 9, 2010, at the National Harbor, Md.

In this issue, learn how our Decontamination Family of Systems program will develop systems to include decontaminant solutions, applicators, processes, and other technologies to meet the high priority capability gaps for contamination mitigation of both traditional and non-traditional chemical and biological warfare agents. Also in this issue, read about the new provisional Biosurveillance office under the Joint Project Manager Chemical Biological Medical Systems. This office will integrate processes and resources to facilitate development of relevant products and tools for the Biosurveillance mission.

Much like the success of JPEO-CBD is dependent upon the strength of our collaboration with industry partners, the success of the Chem-Bio Defense Quarterly magazine is reliant upon your readership. I solicit your thoughts, comments, and suggestions for improvement. Visit our public website, http://www.jpeocbd.osd.mil, to complete our Readership Survey. Tell us how to maintain your interest.



Chem-Bio Defense Quarterly magazine is published quarterly by the Joint Program Executive Office for Chemical and Biological Defense. Articles reflect the views of the authors and do not necessarily represent the views of Chem-Bio Defense Quarterly, the Department of the Army or the Department of Defense.

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# Acquisition Reform

## A Practical Approach for Both Government and Industry

*By: Gregory L. Davies*


In a recent address to a group of JPEO-CBD Program Managers (PMs) on the subject of Acquisition Reform, I took liberties with an old Mark Twain quote, telling them, "Acquisition reform is like the weather, everybody talks about it, but nobody ever does anything about it." That may be true in other organizations, but JPEO-CBD adopts and incorporates acquisition reform. JPEO-CBD takes the initiative to manage the very complex acquisition processes and cycles to get the job done better and faster. So, what does all this talk of acquisition reform really mean?

### What is Acquisition Reform?

After many years of working in the field of acquisition and contracting, I can't recall a time when someone, whether in Congress, the Pentagon, or even Industry, wasn't clamoring for some type of DoD acquisition process reform. I'll admit, Government procurement is not perfect, but it is not as bad as the reformers would have you believe. In the last ten years we've seen a wide acceptance of commercial practices and the removal of inflexible and expensive Government specifications, but these changes were just the low hanging fruit. Many proposed solutions are difficult, if not impossible, to implement because they fail to understand the existing regulations that define the underlying processes. A major delay in reforming acquisition was the system-wide reduction of people that made up the acquisition workforce. Hence, with the introduction of the Global War on Terrorism, including two hot wars, the acquisition process, purportedly designed to support Warfighters, was brought to its breaking point. This decline was brought to light in 2007 by an acquisition commission lead by former DoD Acquisition Chief, Dr. Jacques Gansler. To fix the DoDs acquisition business unit, Gansler recommended four basic reforms:

1. Add contracting people.
2. Properly restructure.
3. Train.
4. Legislate acquisition reforms.

The Gansler Report started this latest wave of reforms, and, for the first time in my career, I'm seeing some real action to address and fix the acquisition system. Today, Gansler's four basic recommendations have transmuted into a myriad of laws, guidance, policies, directives, and other official direction that continue to flood the acquisition workforce. Just this summer (June 28, 2010) Dr. Carter provided further guidance in a memo to "reform its (DoD's) acquisition system." To follow the rules of acquisition reform, you must first read and understand all the guidance and policies, then implement them. The key point to remember is that no one activity or command can change the acquisition process, but each command, activity, department—indeed, each individual-- must do his part in making acquisition reform a reality. So let's explore some practical things that can be done in our programs and activities that will seek to meet the objectives of acquisition reform.

### What is JPEO-CBD Doing About Acquisition Reform?

Government acquisition offices, like the JPEO-CBD, are required to follow DoD regulations that govern the entire procurement process, which includes all the new guidelines/directives. However, we can't be held captive by these regulations. We need to assimilate new regulations with current ones, read and study them, understand them, and then implement them. Every activity is different, so reforms need to be incorporated in ways tailored to your unique business and its processes. What we must do as acquisition professionals is a back-to-basics common sense approach to our businesses. I'm advocating going back to Dr. Deming's philosophy of "continuous improvement" because if our processes aren't working, we need to take ownership and fix them. JPEO-CBD, under the leadership of Brig. Gen. Jess Scarbrough, has conducted a bottoms-up review of its acquisition policies. Policies that do not add value or speed to the process are deleted or updated. JPEO's acquisition review processes focus on quality, speed, and compliance. JPEO has

also brought in "contracting integrators," seasoned contracting personnel, who are empowered to bridge the gap between the PMs, the JPEO staff, and the contracting office. Embedding contracting professionals with the customer was one of Gansler's recommendations. It has paid dividends for the JPEO with significant gains in efficiencies and the timeliness of acquisition reviews. The JPEO has also sought to gain efficiencies in its contracting operations by consolidating its contracting activities under one contracting center and one Principal Assistant Responsible for Contracting (PARC). This centralization of contracting under one common set of rules and templates will improvement efficiencies, speed the contracting cycle, and save money. JPEO is putting the "form" in acquisition reform.

**How does Acquisition Reform Impact Government Program Managers?**

The first step in any planned acquisition is for Program Managers to "define the contract requirement." This is the most critical part of the procurement process since well-defined contract requirements will ensure the Government obtains exactly what it wants, in the right quantities, at the best cost and value. PMs are responsible and accountable for providing quality contract input documents based on the approved Acquisition Strategy. These basic documents include Statements of Work (SOW) and Independent Government Cost Estimates (IGCE). SOWs must clearly identify the work to be conducted, the performance levels/objectives, and deliverables. Further, they must be performance based, have quantifiable metrics or performance standards incorporated, and must allow for proper post award oversight. Such post-award oversight is typically provided by a Contracting Officer Representative (COR) who is responsible for monitoring and documenting contractor performance. Finally, PMs should write requirements that challenge the existing technology levels. Acquisition reform encourages and supports conducting "competitive prototyping" of systems, so requirements documents should enable Industry to provide alternate solutions for prototyping. Competitive prototyping is a reform initiative that should be embraced by all program managers. Recent reform legislation (e.g., Weapon Systems Acquisition Reform Act of 2009) also places additional oversight on Government Cost Estimates. Cost estimates must be of the highest standards with well thought out rationale for all cost projections to include contingencies. Estimates must cover the life of the planned contract period, including options, and life cycle costs for the sustainment, repair, and maintenance of systems. Three main documents that PMs are required to generate to support their

requirements are the Acquisition Strategy (AS), the Acquisition Plan (AP), and the Source Selection Plan (SSP). PMs need to focus on improving the quality and clarity of these base acquisition documents and ensure that they support their requirements. They must also focus on speeding up their processes to drive efficiencies.

**Acquisition Reforms and Industry**

Acquisition is a two-way street; the government defines needs and requirements, and industry turns needs into products or services, a true symbiotic relationship. This relationship has sometimes suffered from cost and schedule overruns. Much of the recent legislation is focused on correcting these problems by changing internal processes, creating better cost estimates, and conducting better oversight and monitoring of contract performance. The Government understands that it plays an important part in addressing these problems and is focused on writing better requirements documents. A clearer, better defined SOW should create more predictable results from Industry. The Government is also being required to focus on performance measurements and standards, so suppliers will see more performance based requirements reflected in our SOW/ Performance Work Statement (PWS). Industry should expect more Government oversight by CORs with more focus on performance and cost controls. Industry will be asked to maintain leaner organizations, as DoD budgets will not continue to grow at the same rate as the post 9-11 years. There will be more scrutiny of indirect cost rates, as we desire to gain value from direct costs. The concept of "best value" contracts will continue, but we will also be looking more closely at costs and prices and may be less willing to trade off for higher priced hardware. I predict that Industry will see more Lowest Priced Technically Acceptable (LPTA) approaches in Government evaluations of proposals, as we seek high quality at the most reasonable prices.

Acquisition reform is achieved through educating the key procurement stakeholders-- Government, PMs, Contracting Officers, and Industry-- in the latest acquisition reforms, as each plays a critical part in the process. However, education and understanding are just the beginning. Each of these players must also understand the rules so that any actions are within the confines of compliance, both regulatory and ethical compliance. Each stakeholder must take actions on the parts of the acquisition process that he/she controls. We can only improve that which we control, and if every level follows this same principle, the entire process will gain efficiencies. Acquisition reform, while complex, at its core requires action at every level, to drive efficiencies and make value added improvements. We own our processes, so it is up to us to make them better, to reform them. Stop thinking of acquisition reform as an abstract set of policies and guidance, instead acquisition reform should be seen as an individual responsibility. Each of us, both individually and as team members, must take ownership of this responsibility to reform, to improve, and to expedite the processes. This is the real meaning of acquisition reform.


# Incorporating Industry Innovation Into the JPEO Enterprise

*By: Kevin Walter Smith*

## One of the core thrusts of the JPEO Future Acquisition Directorate (JPEO-FA) is to remain vigilant in ensuring the Enterprise maintains a forward-leaning posture.

The Joint Science & Technology Office - Science & Technology Managers (JSTO STM) look to develop/mature emerging technologies. These technologies may come from Industry or institutional innovation as a by-product of practicing excellent science. JPEO-FA is challenged with assisting the joint project managers (JPMs) with turning scientific innovation into an integrated materiel solution (device, knowledge, equipment) to meet the Warfighters' needs. It is essential to incorporate industry developments in all aspects of the DoD acquisition paradigm, whether in the development of an emerging technology, in the end states of evaluating technologies in a test bed, and even having a validated end item meet full rate production to be deployed to the Warfighter.

The Advanced Planning Briefing for Industry (APBI) is one of the best forums for the Future Acquisition Directorate to make critical contacts and build relationships with Industry leaders and technology developers who may design a next-generation device or a therapeutic that the Nation's Warfighters can utilize. Perhaps the most difficult aspect of being a member of the directorate's "tech watch" is being able to assist the JPMs to wisely discern the probability or likelihood of a promising technology making it through the programmatic rigors of the DoD Acquisition Cycle and into the hands of the Warfighter. From the standpoint of the Future Acquisition Directorate, a successful APBI may lead to several strategic meetings with the JPMs and the respective companies or institutions as the technology develops to give JPEO-CBD leadership insight on how the technology matures throughout the acquisition cycle. While conducting these periodic meetings, the FA Directorate must maintain effective contact with Science and Technology colleagues from JSTO, Department of Homeland Security, and other government agencies. Open lines of communication ensure the most effective and efficient technologies are employed by the JPMs. For the Future Acquisition Directorate, the APBI is just the beginning of another avenue for discovering an emerging technology which could greatly affect the JPEO Enterprise for years to come.

# Face Free Respirator Protection Takes to the Sky

*By: Kevin Manley*

The days of the Warfighter taking flight in an all encompassing chemical, biological, radiological and nuclear (CBRN) protective respirator are numbered. The Joint Service Aircrew Mask Rotary Wing Team recently performed and successfully completed its first Developmental Test Flight Assessment for the Joint Service Aircrew Mask Rotary Wing (JSAM RW) variant (MPU-5(V)/P) with the United States Coast Guard (USCG) from April 13 to April 30, 2010.

The JSAM MPU-5(V)/P is the first joint service respirator that provides general purpose rotary wing aviators with the ability to fly without pre-donning a CBRN mask prior to take off. This revolutionary design provides rotary wing aircrew with above-the-neck protection and the ability to complete most missions in a face free configuration. The JSAM MPU-5(V)/P also provides Joint Service aircrews the ability to integrate with existing flight helmets, below-the-neck CBRN ensembles, and aviation life support equipment.

Joint Service Aircrew Mask Rotary Wing (JSAM RW)

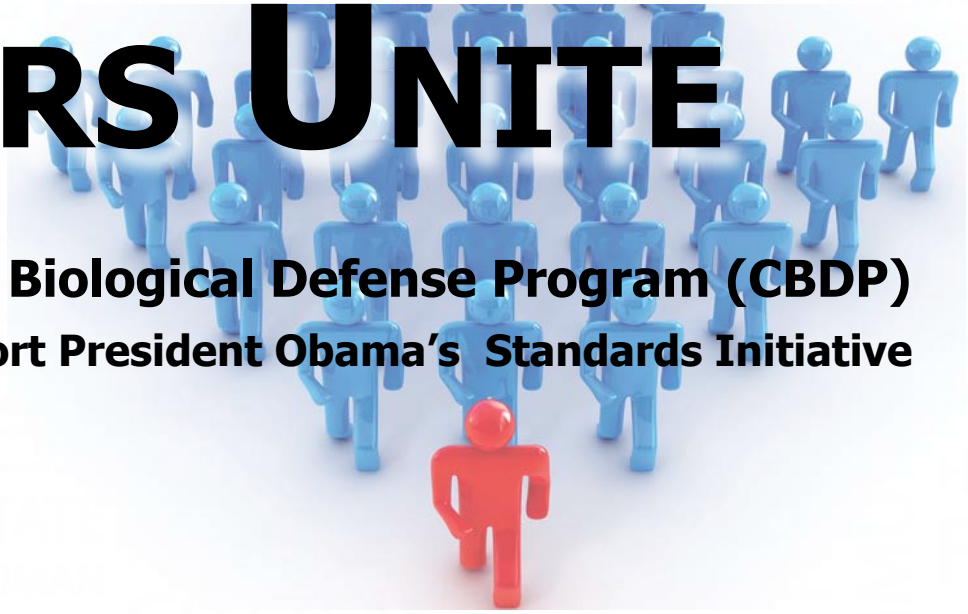
The JSAM team, Joint Project Manager for Individual Protection, aircrew, and Aircrew Life Support (ALS) personnel from the US Coast Guard Aviation Training Center in Mobile, Ala., began by completing mask size and fit testing, aircrew life support equipment integration, H-60T and H-65C helicopter platform simulator and ground cockpit assessments, refueling, pre/post flight checks, as well as individual weapon compatibility prior to flight operations.

US Coast Guard aircrews in the H-60T and MH-65C performed rescue and Airborne Use of Force (AUF) missions including: hoisting helicopter rescue swimmers and baskets to and from the deck of ships, disabling engines on a non-compliant go-fast vessel, and fire support for Coast Guard boarding teams by aircrew wearing the JSAM and firing from platforms equipped with 7.62 mm machine guns and .50 caliber precision rifles.

Coast Guard aircrews successfully completed all flight operations while wearing the JSAM MPU-5(V)/P in the docked and undocked face free positions and accumulated over 17.5 hours of flight time. Coast Guard test participants commended the capability to perform a significant portion of CBRN mission in Mission Oriented Protective Posture (MOPP) two and one-half rather than with the USCG legacy system which requires the crew to be fully encumbered in MOPP-IV from mission start to mission completion.

The JSAM MPU-5(V)/P provides the Warfighter with a single respirator for general purpose rotary wing platforms.

# Leaders Unite



## Joint Chemical and Biological Defense Program (CBDP)

### Leaders Unite to Support President Obama's Standards Initiative

*By: Deborah Shuping*

Through the White House National Science and Technology Council (NSTC) Subcommittee on Standards, President Obama has initiated the adoption of chemical, biological, radiological, nuclear and high yield explosive (CBRNE) standards across the Federal government. On July 19, 2010, DoD leaders provided a key piece of the President's national strategy for CBDP Test and Evaluation (T&E) standards.

The President's impetus was given DoD guidance and direction under the leadership of Mr. Andrew Weber (ATSD (NCB)) in his CBDP Program Strategy Guidance. This has now been implemented in the CBDP T&E Standards Development Plan, a policy just signed out by Mr. James Cooke, the Assistant Deputy Under Secretary of the Army for T&E in his capacity as the joint CBDP T&E Executive. The plan defines the joint community's processes and procedures for developing T&E standards, and represents a year of hard work, cooperation and coordination by the entire joint CBDP community. Leadership concurrences were obtained from the Joint Program Executive Office for Chemical and Biological Defense, the Joint Requirements Office, the Joint Science and Technology Office, and the four service Operational Test Agencies prior to publication of the policy, ensuring a clear path ahead for implementation.

The joint CBDP acquisition community recognized the need for standardized test procedures long ago. Validated test infrastructure that produces reliable, reproducible data is essential to quality CBDP system development. Due to the technical complexity and wide variety of CBDP systems and technologies, and the divergent requirements of numerous stakeholders, the goal of standardized testing has been difficult to achieve. Mr. Weber's leadership on the use of test standards has opened the door for the CBDP T&E community to kick-start the implementation of T&E standards across the DoD.

The White House NSTC Subcommittee on Standards Roadmap Working Group is currently developing a national strategy for the adoption of CBRNE standard methodologies and procedures for all federal, state, local and tribal agencies. The interagency group, co-chaired by the Department of Homeland Security (DHS) and the National Institute of Standards and Technology (NIST), is planning the path forward to acquire reliable CBRNE defense equipment and to share CBDP test data across government agencies.

In accordance with this national strategy, CBDP T&E standards that result from this new DoD policy will be shared with all government, academic and industry partners that provide test data to the DoD, as well as with our federal interagency and international test partners. This sharing of standards will enable the collective use and comparison of data across test facilities, reduce test redundancy, improve the quality of test results and cut the high costs currently associated with chemical and biological testing. CBD equipment vendors competing for DoD contracts will be incentivized to use DoD standard test methods so test data will be accepted by the DoD.

Implementation of the CBDP T&E Standards Development Plan is underway, with numerous standard documents in the final stages of approval and publication. This was accomplished through the T&E Capabilities and Methodologies Integrated Process Team (TECMIPT). The CBDP T&E Executive formed the TECMIPT in 2003 to provide technical support to the CBDP. It is composed of subject matter experts from across the joint DoD CBDP community. In addition to its role in identifying test infrastructure and methodology gaps to support the Program Objective Memorandum (POM) budget process, the TECMIPT now develops and reviews test methodologies, requirements and validation documents for test infrastructure and recommends them for approval and publication by the CBDP T&E Executive as T&E standards. In the past six months, the TECMIPT expanded its membership to include the DHS and the NIST, whose representatives will provide expertise as the TECMIPT expands its role to include the development of nuclear/radiological T&E standards.

DoD T&E standards ensure the validity of test results to inform acquisition decisions. They result in repeatable test procedures and data, and direct comparison of test results obtained from different validated DoD or non-DoD test facilities. Additionally, they increase DoD confidence in contractor test data and reduce the need for test redundancy that causes acquisition program cost overruns and schedule slips. By endorsing the CBDP T&E Standards Development Plan, DoD leadership has reached a major milestone in advancing the quality of CBDP systems to meet Warfighter and civilian needs while saving taxpayer dollars.

# Decontamination Family Of Systems

# Creating Opportunity for Industry

*By: C. Daniel Rowe, Ph.D., and V. Murphy, PM-DFoS*

The JPM-Decontamination (JPM-DC) vision for POM FY12-17 is to provide a Contamination Mitigation focused investment approach supporting the National Military Strategy to Combat Weapons of Mass Destruction. JPM-DC will incrementally field integrated, dual purpose technologies that are technologically and fiscally feasible and that address high priority capability gaps in accordance with the current POM Strategy Guidance (PSG) and the 2009 Joint Priority List (JPL).

To address these challenges, the Decontamination Family of Systems (DFoS) program will develop systems to include decontaminant solutions, applicators, decontamination processes, and other contamination mitigation technologies to meet the high priority capability gaps for decontaminating traditional and non-traditional chemical and biological warfare agents from personnel, equipment, vehicle interiors/exteriors, terrain, and fixed facilities (see Figure 1).

The DFoS strategy is to facilitate the rapid transition of mature Science and Technology (S&T) research developments to existing JPM-DC Programs of Record, thereby guiding S&T community efforts toward meeting the needs of the Warfighter. DFoS will utilize an incremental acquisition strategy to more rapidly deliver capabilities to the Warfighter. In concert with the Defense Threat and Reduction Agency's (DTRA) Joint Science and Technology Office (JSTO), JPM-DC is investigating next generation decontaminants, novel applicators, and other technologies that exhibit potential to work in a complementary fashion – as a family of systems.

The DFoS strategy envisions multiple technologies entering into Technology Development through the use of JSTO Broad Agency Announcements (BAAs), Joint Program Executive Office (JPEO) Competitive Prototyping initiatives, and the continued leveraging of near-term (e.g. Commercial Off-The-Shelf/ Government-Off-The-Shelf (COTS/ GOTS)) technologies. Multiple Technology Development Phase contracts will be awarded via full and open competition. Competitive prototype demonstrations will afford industry many opportunities to showcase their decontamination products and expertise.

The Fiscal Year 2012-2017 (FY12-17) Program Strategy Guidance (PSG) Implementation Plan specifically directs the CBDP to develop a comprehensive S&T portfolio and partner with industry for the technological advances that will protect

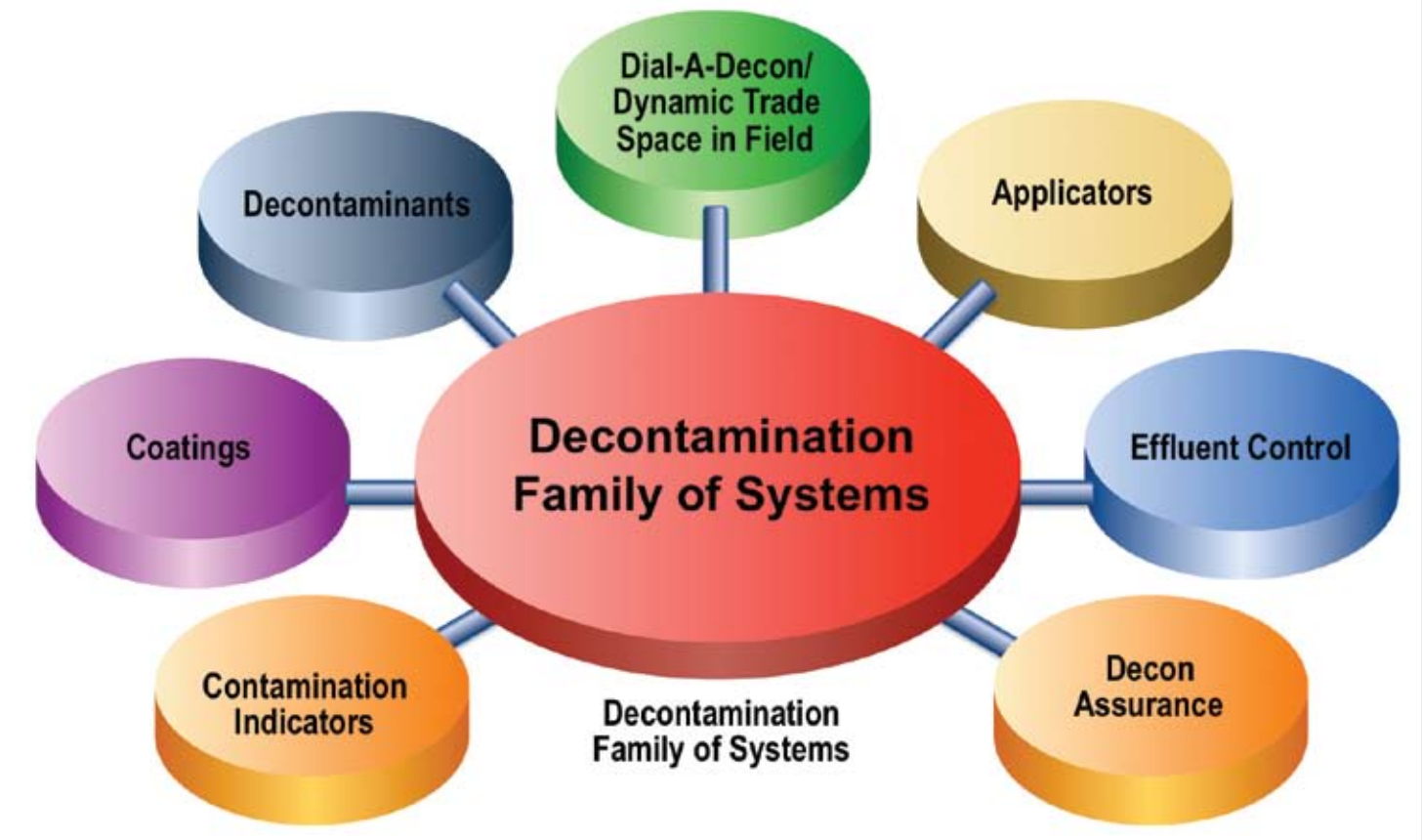



Figure 1. Decontamination Family of Systems

| Capability | Technology Enabler | Outcome |
|---|---|---|
| Decontaminants | RSDL | Increase efficacy over broad threat spectrum |
| | Gaseous decontaminants ($VHP/ClO_2$) | Sensitive equipment capability |
| | Dry Decontaminants/ Solid Oxidants/ No Rinse | Improved logistics/ Reduce water/ Reduce labor |
| | Enhanced Surfactants/Solvents | Increased efficacy over broad threat spectrum |
| | Dial-a-Decon/ Additives/ Formulation variables | Increased efficacy over broad threat spectrum Tailored response to threat scenario |
| Applicators | Automated/Robotic vehicle decontamination | Improved efficacy for increased throughput Reduce logistics |
| | Joint Services Transportable Decon System – Small Scale | Portability/High pressure |
| | Joint Material Decon System | Sensitive equipment/ Platform interior |
| | Joint Services Personnel Decon System | Improved efficacy skin decontamination |
| | Decon Wipes | Multiple uses- Skin/ Sensitive equipment/ Human remains |
| | Dial-a-Decon | Scaleable to deliver, on-demand decontaminants/Self-contained decontamination capabilities |
| Agent Identification | Agent Disclosure spray or coating | Improved efficacy/ Reduced logistics/ Reduced labor |
| | Decontamination Assurance spray or coating | Improved efficacy/ Reduced logistics/ Reduced labor |
| Coatings | Self Decontaminating coatings | Reduced warfighter burden/ Improve optempo |
| | Strippable coatings | Reduced warfighter burden/ Improve optempo |
| | Protective coatings | Reduced warfighter burden/ Improve optempo |

Figure 2. DFoS Capability Technology Enablers

U.S. forces and U.S citizens against emerging threats. JPM-DC takes this directive seriously by coordinating with JSTO on the CB Hazard Mitigation S&T Plan and will strategically partner with industry, the Joint Services, Combatant Commands (COCOMs), Other Government Agencies (OGAs), and Allies for the best solutions. Industry's opportunities are further expanded by the JPM-DC's alignment with the JPEO's Trail Boss mandates that include significant contributions for Major Defense Acquisition Programs (MDAPs), for Advanced Threat (AT) efforts in Plan & Prepare (Pre CBR Contamination) and for Respond, Recover, & Restore (Post CBR Contamination).

Historically, developmental efforts have focused on using a single decontaminant with multiple application methods (the choice of applicator was dictated primarily by the magnitude of the area being decontaminated). However, the DFoS approach represents a fundamental change in that the emphasis will not only be on decontaminants, but also on applicator systems, contamination indicators, active/passive coatings, and selected countermeasure technologies. DFoS recognizes that there is not a "silver bullet" to solve the many decontamination shortfalls; however, close coordination with industry will allow for the leveraging of a wide range of technologies to support current operations and to improve the capabilities provided by JPM-DC Programs of Record (PORs). Figure 2 provides a sampling of the opportunities available to industry that will support not only the DFoS effort, but by extension JPM-DC PORs. Pursued capabilities will enhance current decontamination capabilities as defined in FM 3-11.5, NBC Decontamination, and also provide opportunities to modify decontamination concepts of operation to streamline contamination mitigation procedures for the Warfighter and maintain operational tempo.

DFoS outcomes are focused on providing the following benefits to the Warfighter:

- Decrease the labor/manpower requirements to perform decontamination operations while minimizing the logistics footprint
- Reduce negative health effects on Warfighters
- Return Warfighter to the lowest Mission Oriented Protective Posture (MOPP) level as soon as possible
- Increase throughput in the Detailed Equipment Decontamination process
- Reduce the weight and cube transported to theater for decontamination operations
- Reduce water requirement for decontamination process and rinse operations
- Improve decontamination efficacy to satisfy a broader threat spectrum
- Provide the Warfighter the ability to tailor response to threat scenario and actual contamination level
- Provide scaleable and modular systems with "plug-n-play" capabilities
- Decrease the time lapse between threat detection and mitigation
- Maintain interoperability with technologies outside of JPM-DC (e.g. Individual Protection, detectors, etc.).

JPM-DC is targeting technology enablers that support desired DFoS outcomes (itemized in Figure 2). Examples of DFoS technology enablers include:

Gas-phase decontaminants – The proliferation of sensitive equipment on and near the battlefield dictate the requirement for sensitive equipment decontamination. This includes items such as computers, night vision goggles, electronic recording devices, video monitors, aircraft interiors, and other electronic devices. Given that aqueous phase decontaminants tend to harm electronic devices, gaseous decontaminants such as vaporized hydrogen peroxide (VHP) and chlorine dioxide ($ClO_2$) are being pursued as technology enablers.

Dry decontaminants/Solid Oxidants – The weight/cube of decontaminants and equipment to be transported to theater must be minimized. For this reason dry decontaminants that can be mixed on-site are being investigated thus reducing

the water-weight and cube of materials required to be moved forward. Other options to reduce or eliminate rinse water requirements in post-decontamination processes are also being investigated.

Automated Decon – Vehicle decontamination is a labor and materials intensive, time consuming process. Methods are being considered to reduce labor and logistics and to increase throughput by automating, including potential use of robotics, the process where prudent.

Indicator Technology – Indicator technology, used as a spray or coating, employs dyes or enzymes that undergo a color change when a hazardous agent is present. The color change provides a visible indication of contamination. An agent disclosure spray visually indicates contaminated areas requiring treatment; this will minimize the time, labor and materials required since only the contaminated area will require decontamination. Indicators could also be employed to visibly show when the decontamination process is complete.

Coatings – As mentioned previously, a key objective of JPM-DC is to reduce the logistics burden placed on the Warfighter. Ideally, decontamination would not require any effort by the Warfighter. This would be the case if surfaces and materials decontaminated themselves. Coatings that could self-decontaminate or absorb and bind warfare agents so they can be stripped off at a later time would reduce the time, labor, and stress involved in Immediate and Operational decontamination operations. In addition, DFoS is examining novel ways to protect difficult to decontaminate surfaces such as rubber and other porous materials by using specialized coatings.

Decon Wipes – Decontaminant wipes (dry or solvent containing) are being investigated to help reduce initial contamination to more manageable levels. These techniques may have dual-use applications as sensitive equipment pre-wipes, skin decontaminating wipes, and/or human remains decontaminating wipes.

Effluent Control – There needs to be a method to clean and recycle contaminated effluent associated with large scale decontamination operations. This ability will eliminate the need to construct a sump in certain decontamination operations and would reduce the hazards associated with performing decontamination operations.

Dial-a-Decon – the moniker used for a decontamination system that can be adjusted on-the-fly (point-of-use) to match the threat scenario encountered. A biological agent on a sensitive equipment item will require a dramatically different decontaminant response than a blister agent on a vehicle. The Dial-a-Decon concept could provide a rapid and effective response to a broad spectrum of threats including traditional, emerging, and selected Toxic Industrial Chemicals (TICs)/Toxic Industrial Materials (TIMs). The broad spectrum response will derive from the ability to modify the decontaminant formulation on site as needed. The Dial-a-Decon concept would be scaleable in order to deliver, on-demand, only that amount of decontaminant necessary. Second generation Dial-a-Decon concepts may directly integrate this flexible decontamination technology with a more scaleable applicator technology. Initial Dial-a-Decon candidate technologies may include on-site additive options for traditional formulations or scaleable versions of brine electrolysis.

Through DFoS, emphasis will be placed on optimizing decontaminant and applicator interoperability with the goal of a holistic approach to hazard mitigation and eventual remediation. Figure 3 illustrates the proposed DFoS acquisition strategy with the past and present states feeding into a future that encompasses new methods and technologies providing an ever expanding decontamination capabilities base.

As JPM-DC refines the construct of DFoS and the next generation decontaminants, both evolutionary (incremental improvements) and revolutionary ("leapfrogging") technologies will be embraced. New capabilities will be specifically adapted to fill ever decreasing decontamination gaps, i.e. becoming more narrowly focused to the job being accomplished theoretically leading to more product differentiation rather than less. As these technologies are pursued, each will offer our Industry Partners an opportunity to compete their technologies for the opportunity to support the Warfighter in their mission "…to dissuade, deter, defend against, and defeat any future adversary in all CBRN threat environments."

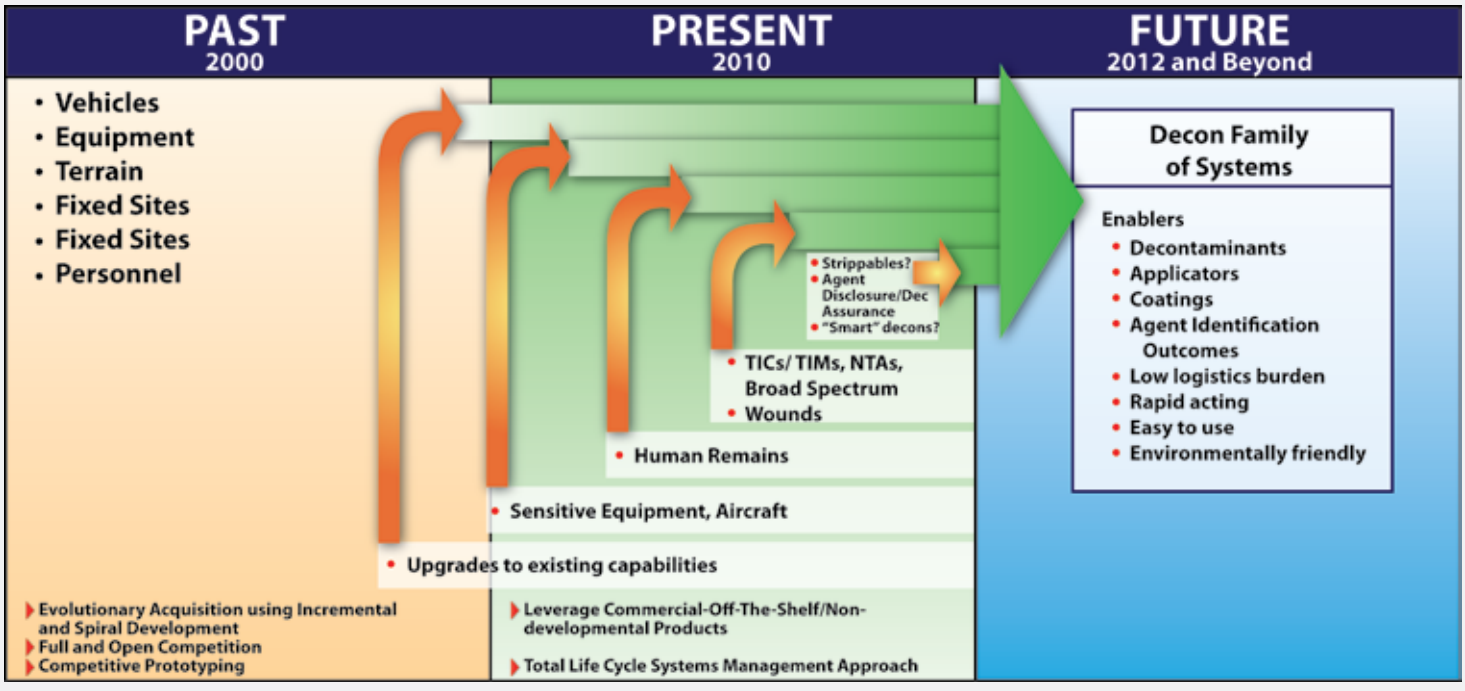



Figure 3. DFoS Acquisition Strategy

# The Next Generation Chemica
## and the Long Road to Dug

*By Edward Conley, System Manager for Next Generation Chemical Standoff Detection*

Thump-Thump-Thump-Thump… I am distracted from my discussions in the command post by the sounds of the explosions from the simulant release during our operational demonstration at Dugway Proving Ground, Utah. As I watch the release and the Warfighters operating a multi-sensor detection system that autonomously detects and tracks chemical and biological releases at significantly improved ranges, I am amazed by the journey which has taken us to this point. And in the end it provides a single three dimensional cloud track to eliminate the clutter from multiple sensor alerts. From inception to technology demonstration to operational demonstration within 18 months...

Well, not really 18 months. It really all started with a vision and a few charts in 1998 but the technology and infrastructure was not available to act on it at that time. I sat in the office of the Project Manager for Nuclear, Biological, and Chemical Defense Systems (PM NBCDS) with then Col. Stephen Reeves (now retired Maj. Gen. Stephen Reeves, former JPEO-CBD) and my boss, Mr. Robert Lyons. Col. Reeves described a chemical-biological detection and warning system which used existing data from other battlefield sensor and intelligence assets to permit better detection decisions and provide significantly enhanced CB situational awareness.

It is a simple concept not unlike what humans do in our daily lives with our five senses. One sense will provide information for our brains to process and direct other senses to find more data. All the information is then combined for situational awareness and decision making. It happens automatically without us being aware of the decisions being made internally.

The idea resonated with me (really my white whale, my obsession) and within a few days I had drawn up a few object diagrams (object oriented systems were just coming into fashion) for Col. Reeves to review. As I said, the technology wouldn't support it at the time but that hasn't stopped me from trying throughout the intervening years as Brig. Gen. Reeves and finally Maj. Gen. Reeves would ask about it. Each time we had varying degrees of success (always better than previous attempts) but on a small scale and only with a small subset of assets.

Then, in 2007, Maj. Gen. Reeves asked JPM Contamination Avoidance to try again. Due to the concerns with the existing standoff detection technologies, we realized that more than a single sensor technology was required to overcome the limitations of the current system. We briefed him on numerous plans until he was satisfied. Maj. Gen. Reeves approved the incremental development strategy in February 2008 with a strong desire to have a technology demonstration and an operational demonstration within a two year timeline. The demonstrations were referred to as the Chemical Biological Distributed Early

Warfighters with Distinguished Visitors

# al Standoff Detection System

## nway Proving Ground

## A Study in Government-Industry Collaboration

Brig. Gen. Scarbrough attends the 2009 operational demonstration

Warnings System (CBDEWS). Nobody liked the name (sounds too much like Scooby Doo) but it stuck. The demonstrations supported the development of the Next Generation Chemical Standoff Detection (NGCSD) and Chemical-Biological Active Standoff System (CBASS) acquisition programs.

We began immediately briefing user and industry groups and had our first official Advanced Planning Briefing for Industry (APBI) in April 2008. At the APBI, we described the planned acquisition strategy and how we planned to get to a solution set. The plan included industry participation in periodic field demonstrations to permit the Government to assess the state of various detection technologies and systems. We invited industry to participate (at their expense) to foster data gathering on their new technologies and concepts as well. The conditions were simple. The technology submitted must meet the criteria laid out in a request for information and the participant would provide all data for assessment by the Government. Many participants from industry responded and demonstrated their technologies at their own expense during the technology and operational demonstrations. In addition, we contracted with three vendors to provide integrated systems during the operational demonstration. Each provided a slightly different viewpoint to fusing sensor data and providing it to the Warfighter.

We also partnered with Johns-Hopkins University Applied Physics Laboratory (JHU-APL), a University Affiliated Research Center for the Department of Defense, to assist us with technology prototyping and assessment. JHU-APL developed a prototype using improvements to existing sensors, new off-the shelf sensors, and a multi-sensor detection algorithm which was used in the technology demonstration (August – October 2008) and the operational demonstration (July 2009) the following summer. JHU-APL also incorporated a limited set of non Chem-Bio sensors to demonstrate that information can be obtained and used to enhance situational awareness.

We also collaborated with other JPMs within the JPEO and other Government PMs and organizations to participate in the CBDEWS demonstrations. We were able to integrate capabilities from the Defense Threat Reduction Agency, the Edgewood Chemical and Biological Center, and the Army Research Laboratory Science and Technology portfolios. Collectively pooling resources, we were able to accomplish far more than any of the individual projects could have accomplished alone. We certainly accomplished more than I expected.

The entire test team was invaluable to the success of both demonstrations. The folks at DPG are top-notch and helped plan and execute the simulant releases and collected all the referee data for the demonstration. Our test engineer devoted his energy to pulling off these groundbreaking demonstrations, taking lessons learned from the first and building on it. Though I'm sure the DPG test team felt he was

peering over their shoulder at times, he eventually grew on them – like mold.

During the operational demonstration, Warfighters actually operated the system. They were quite skeptical about standoff detection based on previous experiences but, by the end of the third day, the team and, more importantly, the prototypes had converted them. They walked away from Dugway with a much better understanding of fielded standoff systems and the new concepts for the future.

Each demonstration concluded with the outstandingly successful Visitors Days and had a host of folks from the many user organizations, test community, S&T gurus, senior officials, and, of course, the JPEO-CBD. Visitors Days were long and grueling for the participants and the visitors but everyone was a trooper. MG Reeves liked what he saw at the technology demonstration. Sadly, he did not see the culmination during the operational demonstration because he had retired a few months earlier. However, BG Jess Scarbrough (JPEO-CBD), Mr. James C. Cooke (Director of the DUSA Test and Evaluation Office), Mr. Rick Decker, former Technical Director of the Edgewood Chemical Biological Center, and a host of others attended the operational demonstration and liked what they saw as well.

Now as I watch the releases unfold at Visitors' Day for the operational demonstration, I'm watching two Warfighters actually operate one of the prototypes – they are able to explain the system to the Visitors and talk excitedly about it with them. They've looked at everything we brought and can see the future right in front of them. They have talked to everyone from the working level to the SES level and the JPEO-CBD, BG Scarbrough without a qualm. The Warfighters get it – they understand my obsession – they see its value and are excited by the possibilities.

Attendees gather for demonstration

At the outset, we planned to develop a multi-sensor detection capability and actually have a Warfighter operate the system 18 months ago. After a lot a work, we put over 150 sensors on the ground or in the air. We remotely emplaced them, flew them, drove them… You name it – we probably did it. Suffice it to say Government and industry partners alike felt that the approach was a healthy way to promote and assess new technology. All parties felt the demonstrations helped their technology development and provided data that they would likely never get elsewhere. Collectively, we gathered vast amounts of data for analysis resulting in a couple of expansive reports outlining the technological possibilities and levels of maturity. The reports contained exciting news, at least to me (cut me some slack - remember this has been my obsession low these many years).

The results indicate that we can actually achieve the goals for a multi-sensor detection system and with just a bit more work could field something in the near term with an incremental acquisition strategy. Better still, the Warfighters can operate the system and they understand the value. And most importantly, even though there were only two operators, they want it.

Unlike Captain Ahab, I did not get consumed by the white whale – at least not yet. Maybe next year … We can do an end to end operational demonstration and include surface contamination mapping… Maybe a real operational exercise….

What can I say? I'm obsessed with this stuff… I might get swallowed up yet.

**JPM Contamination Avoidance would like to express our sincere appreciation to all who participated. We couldn't have done it without your cooperation.**

Aerospace Corporation
AeroVironment
Air Force Institute of Technology
Air Force Research Laboratory
Army Research Laboratory
BBN Technologies
Defense Threat Reduction Agency's ChemRaven,
Global Strike, WMD Aerial Collection System Teams
Dugway Proving Ground West Desert Test Center
Edgewood Chemical and Biological Center
Battle Management &Point Detection Teams
EOIR Technologies
General Dynamics Armament and Technical Products
General Dynamics Robotics Systems
Johns-Hopkins University Applied Physics Laboratory
ICx Technologies
ITT Inc.
Joint Project Manager Biological Defense
Joint Project Manager Information Systems
Joint Project Manager Guardian
Morphix Technologies
Northrop Grumman Corporation
Program Executive Office, Aviation, Project Manager,
Unmanned Aircraft Systems
Physical Sciences Inc.
Raytheon Corporation
Science and Engineering Services Inc.
Sarnoff Corporation
Smiths Detection
TELOPS
Teledyne Brown Engineering
And of course the team here at JPM NBC Contamination Avoidance

# Partnering to Protect

*By: Stephanie Huang, JSAM RW Program Analyst*


The JPEO-CBD annually sponsors Advance Planning Briefings for Industry (APBI) as a means to inform industry members of future business opportunities, and provide participants with the direction of the Chemical Biological Defense Program (CBDP) and future Department of Defense (DoD) requirements. Briefings include details on the Joint Service mid- to far-term science and technology research, development, test, and evaluation plans and programs, future production projections, and emerging military requirements that fill capability gaps. One of the distinct purposes of the APBI is to highlight specific contract opportunities over the next five years. Interested contractors, large and small businesses, and universities are encouraged to participate. Opportunities exist for one-on-one discussions with both the Joint Project Managers responsible for advanced development and procurement and the representatives from the Joint Science and Technology Office responsible for technology base efforts.

This is how the Joint Service Aircrew Mask Rotary Wing (JSAM RW) program began. Joint Service requirements were already established, details were briefed during an APBI, mid- and far-term science and technology research were shared, and a Request for Information was solicited. Potential candidate systems were tested and compared to legacy systems, and a contract was released for an industrial partnership to design and deliver the most unique protective mask in the world today.

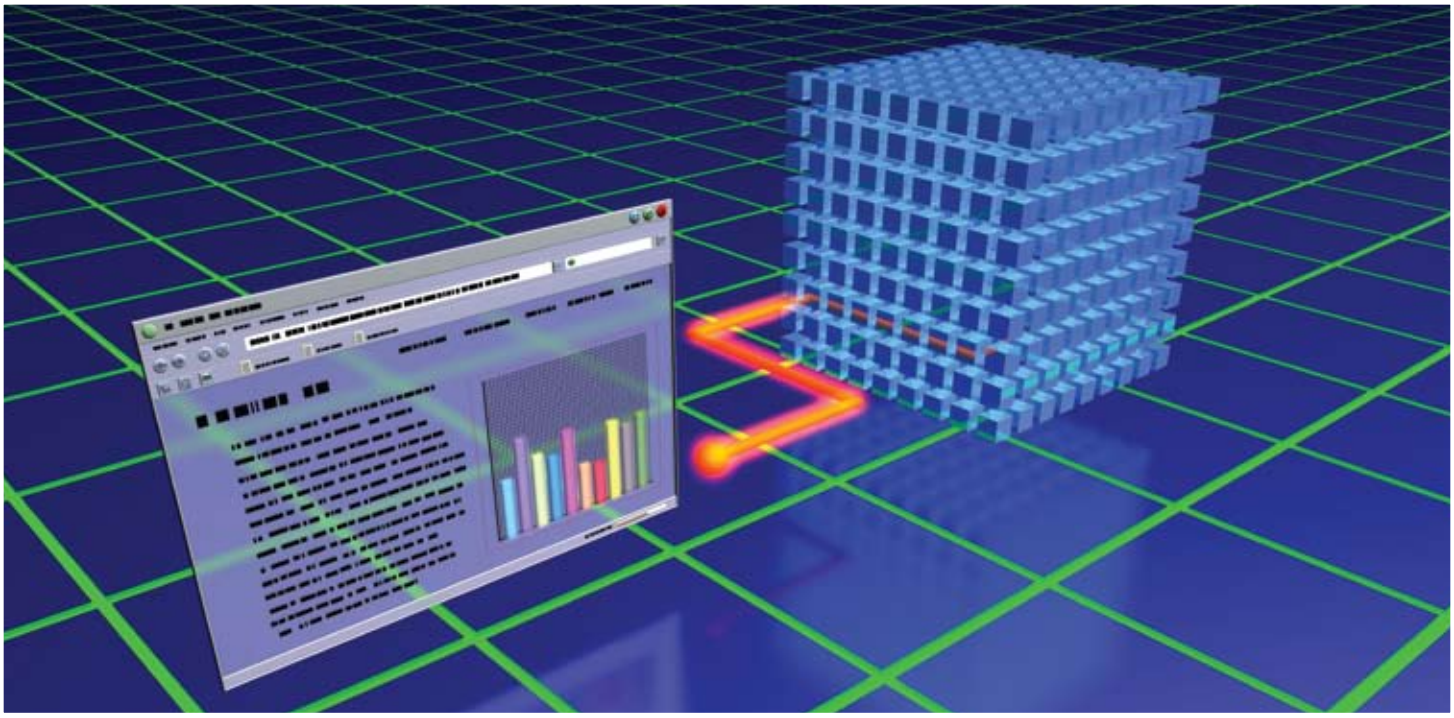
The JSAM RW is a custom device designed with the sole intention of providing Chemical, Biological, Radiological, and Nuclear (CBRN) and Toxic Industrial Chemical (TIC) protection to rotary wing aircrews. More specifically, during sustained operations in the presence of any of the aforementioned threats, the JSAM RW will provide above- the-neck protection for aircrews.

JSAM RW's partnership with industry includes Avox Systems, Incorporated of Lancaster, NY and Advanced Design and Manufacturing (ADM) Division of the Engineering Directorate of Edgewood Chemical and Biological Center (ECBC).

Avox Systems is the primary contractor assigned to supply JSAM Risk Management and has utilized Government facilities and personnel to perform validation testing early in the development of mask systems. This allows the Government and Avox to achieve higher confidence in the mask design prior to beginning the expensive activities associated with mask production. Furthermore, with the assistance of ADM since 2008, utilization of rapid prototyping for assessments of conceptual designs has been completed without significant costs or schedule impacts. Currently, ADM's business model, using high-end prototyping with minimal tooling investment, is being applied to new JSAM RW programs, specifically the JSAM Apache Block III.

The Avox Systems and ADM partnership resulted in the presentation of the JSAM Mask Protective Unit-6(V)/P (MPU-6(V)/P) Full Rate Production request to Brig. Gen. Scarbrough, the JPEO-CBD, on Aug. 31, 2010. As the Milestone Decision Authority, he approved and signed an Acquisition Decision Memorandum on Oct. 26, 2010 which allowed a production and fielding contract award to Avox Systems in May 2010 by the U.S. Army RDECOM Contracting Center in Aberdeen, Md. The JSAM MPU-6(V)/P replaces the M48 Chemical-Biological Apache Aviator Mask and will be compatible with the Army's Integrated Helmet and Display Sighting System (IHADSS) for the AH-64 A/D attack helicopter.

The APBI is an open door of opportunity not only to the Department of Defense, but to industrial partners as well.



# What Makes a "Good" Architecture?

*By Art Laudenslager, JPEO-CBD Software Support Activity (SSA) Architecture Team*

The SSA Architecture Team was recently asked what set of DoD Architecture Framework (DoDAF) views must be present to determine the "goodness" of an architecture. The short answer was, "It depends."

Realizing this answer was unsatisfactory, further explanation seemed to be in order and of potential interest to "Chem-Bio Defense Quarterly" readers.

## BACKGROUND

One of the key concepts on DoDAF 2.0 is "Fit-for-Purpose" architectures. The SSA Architecture team has been on the leading edge within DoD on this concept, viewing even previous versions of DoDAF as what its name says – a framework. This is potentially misleading – per the May 28, 2009 DoD DoDAF v2.0 promulgation memo, the DoDAF is the "prescribed" framework for ALL DoD architectures; however, the views developed are selected by the user to meet their requirements. It is not a mandate to develop every possible view. As a result we develop only those products that are required and useful to the program, and modify or in some cases tailor or extend products as needed, ignoring those that do not contribute to the information needs and goals of the architecture. The Assistant Secretary of Defense for Networks and Information Infrastructure (ASD (NII)) and DoD Chief Information Officer (CIO), the publisher of DoDAF, formalizes the "Fit-for-Purpose" concept as follows:

The term "Fit-for-Purpose" is used in DoDAF to describe an architecture (and its views) that is appropriately focused (i.e., responds to the stated goals and objectives of the process owner), is useful in the decision-making process, and responds to internal and external stakeholder concerns. Meeting intended objectives means those

The bottom line for architecture is there is no single view or group of views that qualify architecture as “good”.

actions that either directly support customer needs or improve the overall process undergoing change.

There are 52 different architectural models described in DoDAF v2.0, grouped into eight “Viewpoints”: All, Capability, Data and Information, Operational, Project, Services, Standards, and Systems.

While DoDAF itself is not prescriptive as to what products must be developed (DoDAF is the prescribed framework for all DoD architectures), CJCSI 6212.01E Interoperability and Supportability of Information Technology and National Security Systems, is prescriptive, at least for Information Technology (IT)-centric systems, and those that have the Net-Ready Key Performance Parameter (NR-KPP) specified in their current requirements document. Figure 1 is a depiction of Table E-1 of that Instruction. As a rule of thumb, the SSA Architecture Team follows this guidance, utilizing only those products required.

Of the architecture products required by CJCSI 6212.01E, one cannot point to a single view or even a group of views and determine that, solely based on their existence, the architecture is “good.” Each view can contain a large number of objects (each symbol or line being an object), and each object has underlying descriptions of what the object is, such as what operational data elements it generates, consumes, or transfers, and how it is relates to other objects in the architecture. Further, the architecture Meta Model (the data collected in architecture) is expandable and customizable to the needs of the stakeholder. One could construct a great number of these views that graphically look good, but have no underlying detail. This limits the utility of the architecture to provide a basis for detailed design; ensure that the system is feasible; and that end-to-end interoperability is achievable. In short, without the detailed information behind the objects, at first glance the architecture would appear “good”, but apart from use in presentation slides or document graphics, it would be relatively worthless. As illustrated in Figure 2 , the “goodness” of architecture increases with the amount of detail available and included in the architecture. A good architecture captures as much detail as possible, and will allow for the tracing of every component and each necessary data element from origin to consumer.

In addition to the required development and inclusion in Joint Capabilities Integration and Development System (JCIDS) documents, architecture views have many potential uses. Architectures can be used in Requests for Proposal, Information Support Plans (and variants), Information Assurance plans, test plans, program briefings, operator manuals, troubleshooting guides, and training materials, to name a few. How the views are used, the underlying details, and how well they convey their information, determines their usefulness. The views required will vary depending on what information needs to be conveyed; note, this can be a highly subjective.

## ARCHITECTURE PRODUCTS

Full descriptions of architecture products can be found in DoDAF 2.0, or in the architecture descriptive documents the SSA Architecture Team produces. In the interest of saving space, they will not be repeated here.

## WHAT MAKES A VIEW “GOOD”?

The following describes what, in our view, is required for each of the 24 architecture products that the SSA Architecture Team normally develops to support JPEO-CBD architectures in order for it to be considered a good product:

Overview and Summary Information (AV-1): Describes what is planned to be done, or what was done, in an architecture effort

Integrated Dictionary (AV-2): Contains every object in the architecture encyclopedia. Each is defined by a textual description.

Capability Taxonomy (CV-2): All operational capabilities depicted in a hierarchical format. Each capability is fully defined and listed in AV-2.

Capability Dependency Model (CV-4): All operational capabilities are depicted, in a parent-child form. The dependencies among the capabilities are depicted and described in the AV-2.

High Level Operational Concept Graphic (OV-1): Graphically pleasing and conveys the operating environment of the system.

Operational Resource Flow Description (OV-2): Each Operational Node involved

| Document | Supportability Compliance | DOD Enterprise Architecture Products (IAW DODAF) (see Note 5) | | | | | | | | | | | | | | | | Data/Service Exposure Sheets | IA Compliance | GTG Compliance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AV-1 /AV-2 | OV-1 | OV-2 | OV-3 | OV-4 | OV-5 | OV-6C | OV-7 | SV-1 | SV-2 | SV-4 | SV-5 | SV-6 | SV-11 | TV-1 | TV-2 | | | |
| ICD | | | X | | | | | | | | | | | | | | | | | |
| CDD | X | 3 | X | X | X | X | X | X | | | X | X | X | X | | 2 | 2 | 1 | X | X |
| CPD | X | 3 | X | X | X | X | X | X | 1 | | X | X | X | X | 1 | 2 | 2 | 1 | X | X |
| ISP | X | 3 | X | X | X | X | X | X | 4 | | X | X | X | X | 4 | 2 | 2 | 1 | X | X |
| TISP | X | 3 | X | | X | | X | X | | X | | | X | X | | 2 | 2 | 1 | X | X |
| ISP Annex (Svcs/ Apps) | X | 3 | X | | | | X | | | | X | X | X | X | | 2 | 2 | 1 | X | X |
| X | Required (PM needs to check with their Component for any additional architectural/regulatory requirements for CDDs, CPDs, ISPs/TISPs. (e.g., HQDA requires the SV-10c) | | | | | | | | | | | | | | | | | | | |
| Note 1 | Required only when IT and NSS collects, processes, or uses any shared data or when IT and NSS exposes, consumes or implements shared services. | | | | | | | | | | | | | | | | | | | |
| Note 2 | The TV-1 and TV-2 are built using the DISRonline and must be posted for compliance. | | | | | | | | | | | | | | | | | | | |
| Note 3 | The AV-1 must be uploaded onto DARS and must be registered in DARS for compliance | | | | | | | | | | | | | | | | | | | |
| Note 4 | Only required for Milestone C, if applicable (see Note 1) | | | | | | | | | | | | | | | | | | | |
| Note 5 | The naming of the architecture views is expected to change with the release of DODAF v2.0 (e.g., StdV, SvcV, StdV, DIV). The requirements of this matrix will not change. | | | | | | | | | | | | | | | | | | | |

Figure 1 - CJCSI 6212.01E Table E-1

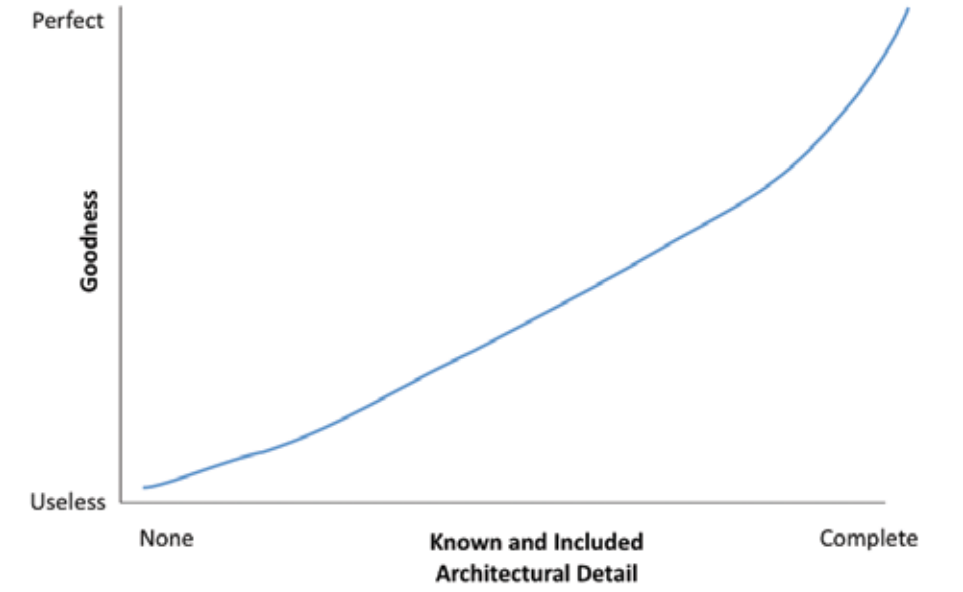



Figure 2 - Architectural Quality

is depicted. Operational activities are assigned to the Operational Node that performs them. Needlines are populated with all distinct information exchanges, and those information exchanges fully defined.

Operational Resource Flow Matrix (OV-3): Auto-generated by the architecture tool from OV-5 and OV-2. If those diagrams are complete, the OV-3 will be complete.

Organizational Relationships Chart (OV-4): Each organization and its command/coordination relationships are depicted and defined.

Operational Activity Model (OV-5): All operational activities are depicted and defined. All Input Control Output Mechanism (ICOM) arrows are defined. ICOM arrows balance from top to bottom in hierarchy. Integration Definition (IDEF) Functional Modeling (IDEF0) rules and conventions are followed.

Operational Event Trace (OV-6c): Appropriate Operational Nodes5 involved are depicted along the top of the diagram, and the information exchanges they perform are depicted as arrows between the nodes in time sequence from top to bottom. An accompanying description that defines the particular scenario or situation is provided.

System Interface Description (SV-1): System Nodes5, System Entities, System Components, System Elements, and their interfaces are depicted and defined to the extent known. All known identified data elements (from DIV-2) are assigned to the appropriate interfaces that carry them.

System Resource Flow Description (SV-2): Each communicating system entity, component, or element is depicted, along with its associated communications connections. All communications connections are defined and the communication protocol is identified.

Systems-Systems Matrix (SV-3): All systems in the architecture are listed, and each relationship is shown.

Systems Functionality Description (SV-4): All System functions are shown and fully defined. Data flows are traceable from top to bottom level functions, and data elements (from DIV-2) are associated with each data flow.

Operational Activity to Systems Function Traceability Matrix (SV-5): An X-in-the-box matrix showing the relationship between system functions and operational activities that are enabled by those functions. A good SV-5 contains all applicable system functions and operational activities at the lowest (leaf) level. All applicable operational activities should be supported by a system function.

Systems Resource Flow Matrix (SV-6): SV-6 is a matrix, auto-generated by the architecture tool, that compiles information from the definitions of objects in SV-1, SV-4, and SvcV-4. If the source objects are fully defined, the SV-6 will be good.

System Event Trace Description (SV-10c): Depicts all systems that interact, and the time-sequenced interactions and state changing events between systems.

Services Functionality Description (SvcV-4): All Services are shown and fully defined. Data flows are traceable from top to bottom level services (if a child diagrams exist), and data elements are associated with each data flow.

Operational Activity to Services Traceability Matrix (SvcV-5): Similar to SV-5, but depicting the relationship between Services and operational activities. The same measures of good apply.

Services Event-Trace Description (SvcV-10c): Similar to SV-10c, but depicts services and their time-sequenced interactions.

Logical Data Model (DIV-2) (formerly OV-7): All relevant data elements are depicted and defined. The architecture for each system that consumes, produces, and communicates data will contain a subset of the CBRN Data Model.

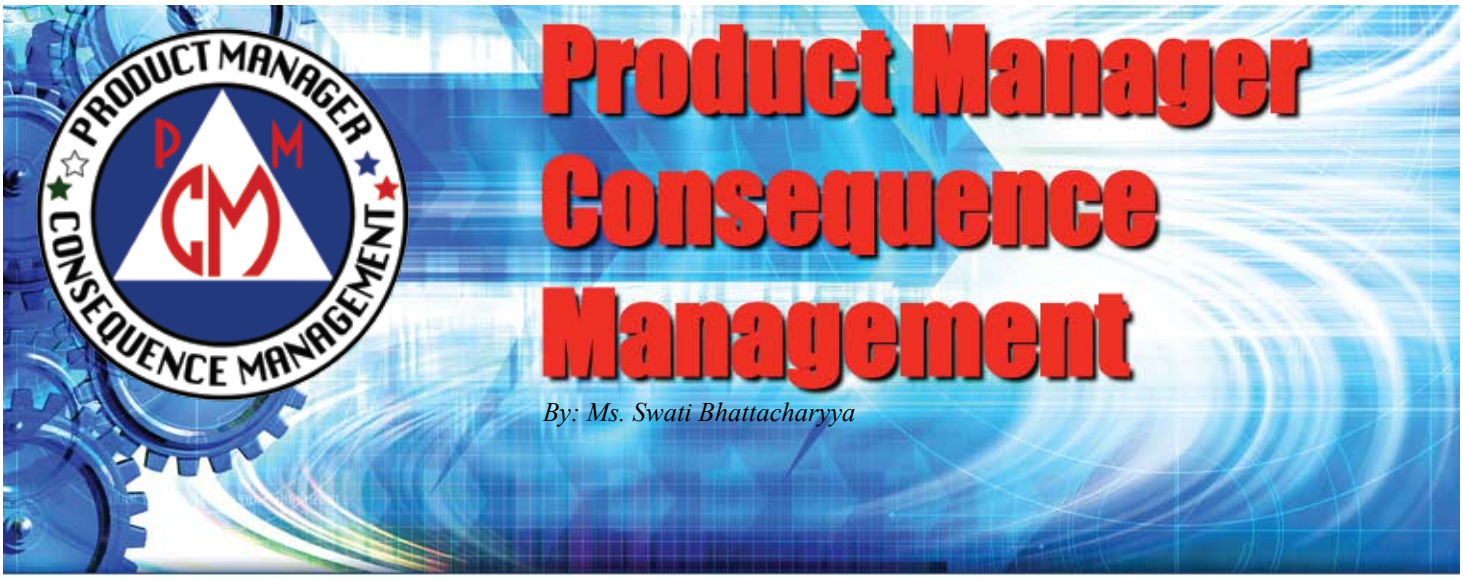
Physical Data Model (DIV-3) (formerly SV-11): All physical data sources are shown, with the data elements they provide or store.

Standards Profile (StdV-1) (formerly TV-1): All current DoD and Industry standards applicable to the architecture are listed.

Standards Forecast (StdV-2) (formerly TV-2): All known emerging standards are listed, with the estimated date which they will become established standards.

## SUMMARY

The bottom line for architecture is there is no single view or group of views that qualify architecture as “good”. Architecture is good only if it fits the purpose for which it was created, responds to the stated goals and objectives of the process owner, is useful in the decision-making process, and responds to internal and external stakeholder concerns. Each JPEO-CBD joint project manager has an SSA Architect assigned to support their architecture needs, answer questions, and assist with the development of “good” DODAF architecture views meet their unique requirements and to aid them in integrating (syntactically and semantically) with the greater CBRN enterprise.




# Product Manager Consequence Management

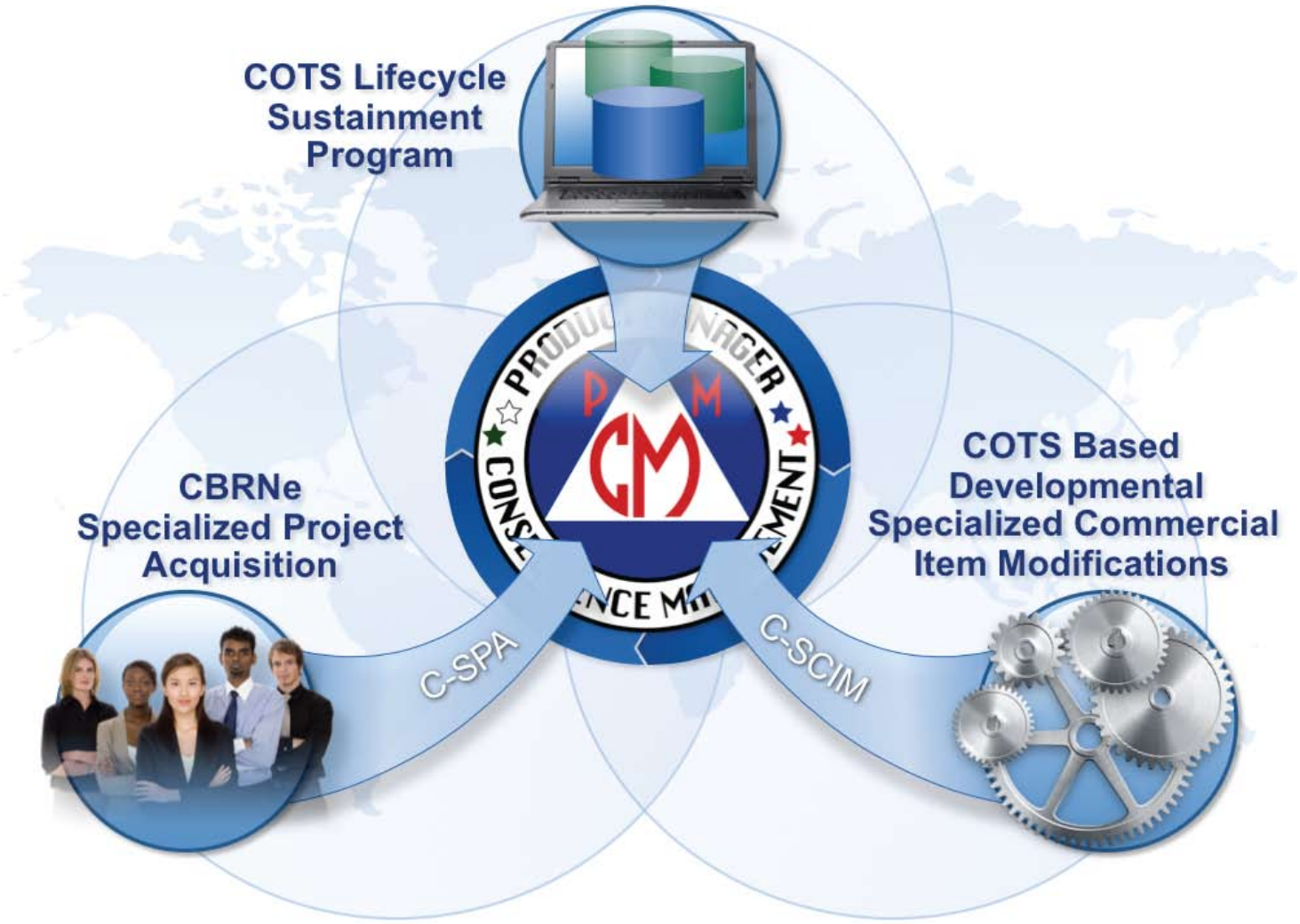
*By: Ms. Swati Bhattacharyya*

**America's military faces many new challenges domestically and abroad from Chemical, Biological, Radiological, Nuclear and Explosives (CBRNe) threats. To mitigate these challenges there is a need to rapidly acquire and field highly effective and reliable Detection, Identification and Protection equipment.**

In the past, the threat to the Warfighter consisted mainly of well-known CBRNe compounds; today the services are facing newer, more "creative" CBRNe threats and the technology in their arsenal must keep up with the rapidly changing threat environment. Timely, effective, response relies heavily on analytical equipment that can provide real time information on the battlefield or domestic incident site. In recent years commercial technologies are being produced in ever smaller footprints with increased capability. Leveraging these technological advances made in the commercial sector is an integral part of our national defense.

The Joint Product Manager Consequence Management (PM-CM) office through direction from the Joint Project Manager Guardian (JPM-G) and the Joint Program Executive Office for Chemical Biological Defense (JPEO-CBD) provides the highest quality CBRNe Commercial Off-the-Shelf (COTS) materiel solutions to DoD Consequence Management responders. PM CM provides a single point of management for CBRNe COTS Life Cycle Management (LCM), and functions as the Rapid Acquisition (RA)/Rapid Fielding (RF) cell for the JPEO-CBD. They currently provide CBRNe equipment to the National Guard Bureau (NGB) Weapons of Mass Destruction-Civil Support Teams (WMD-CST), CBRNE Emergency Response Force Package (CERFP), Homeland Response Force (HRF), the United States Army Reserve Command (USARC) Multi-Purpose Chemical Companies assigned a Homeland Defense Mission, the 20th Support Command (SUPCOM), the Marine Corps Chem/Bio Incident Response Force (CBIRF) and other Homeland Defense or specialized organizations as required.

As technology advances, PM-CM has developed a Technology Roadmap, which is an annually revised document that reviews developing COTS / Government-Off-The-Shelf (GOTS) Technologies and capabilities over the next Program Objective Memorandum (POM) cycle. The Product Manager maintains an open and productive relationship with industry, vendors, and research and development organizations in order to gain an understanding of available capabilities as well as future technologies being developed and tested. Additionally, PM-CM facilitates




vendor demonstrations and product briefs to potential customers. Technology Roadmap inputs and vendor demonstrations help PM-CM to plan for possible modernizations through the POM cycle. Maintaining the PM-CM relationship through established processes is integral to moving toward a more cohesive future with industry and vendors which ultimately benefits the DoD. It is essential that Specialized CM response unit personnel be able to detect threats quickly and immediately identify and characterize them accurately. In order to provide equipment with necessary capabilities, PM-CM must foster good relationships with the commercial sector. These relationships help to leverage rapidly changing technologies to the benefit of the DoD. The PM-CM LCM effort was established with this in mind and consists of three components: the CBRNe – Specialized Project Acquisition (C-SPA) program, the COTS Based Developmental - Specialized Commercial Item Modifications (C-SCIM) program, and the COTS Lifecycle Sustainment Program.

The C-SPA team within PM-CM has the mission to Upgrade and Modernize customers' COTS CBRNe equipment capabilities and evaluates new equipment solutions against emerging standards and requirements. C-SPA services include an annual COTS Modernization (COTS MOD) process to provide customers with validated capability enhancements for fielded COTS equipment. Additionally C-SPA enables specialized units to procure authorized COTS equipment through RA/RF. The COTS MOD process provides a much-needed formal, systematic method to ensure Total Package Fielding of CBRNe COTS equipment. This includes procurement, fielding and training while relying on third party, independent and/or government testing of items to vendors claims to evaluate items against user requirements and needs as applicable. C-SPA and COTS MOD utilizes an enterprise approach, leveraging past, present and anticipated procurements allowing for economies of scale and standardization across the CBRNe COTS portfolio.

The C-SPA team utilizes a formal and systematic method for prioritization, validation, and procurement of CBRNe COTS equipment during the COTS MOD process. Modernization is required due to obsolescence of the fielded items, advancements in technology, changes in mission requirements, and capability increases. The COTS MOD process generates modernization plans based on user (customer) input, Subject Matter Experts (SMEs) from the following commodity areas: Chemical (CWA), Biological (BWA), Radiological (RAD), Personal Protective Equipment (PPE), and Decontamination (DECON), as well as Joint Requirement Office (JRO) Strategic Guidance documents. The CBRNe COTS Annual Modernization Plan (CCAMP) is a cyclical foundation document developed by C-SPA and staffed through JPM-G to the JRO. The CCAMP is used to support POM Submissions and justify current fiscal year (FY) procurements of COTS

items. It is modeled after formal acquisition documents, and provides standardization, strategy, and recommendations for modernization while addressing the Specialized CM Unit Missions.

Ensuring that CBRNe COTS items are tested independently to vendor claims is a major emphasis of the COTS MOD process. Having tested items by third party government sources increases the straightforwardness of the procurement process. Whenever possible, it is desirable for items to be independently tested to a nationally accepted and recognized standard, such as NIOSH, NFPA, or ANSI. Going forward, C-SPA's industry relationships are anticipated to expand on the processes used today. Ideally all CBRNe COTS items will be fully third party tested prior to entrance into the C-SPA database. This would reduce the burden of having to research available testing, and/or the need for the government to fund testing. A crucial element of this relationship is the PM-CM CBRNe COTS Equipment Database. This database is a market research tool used within PM-CM and throughout the JPEO-CBD enterprise. The database enables vendors to input product information and test reports. It is the gateway for an item's consideration for review and procurement to Specialized Consequence Management (CM) customers. All CBRNe COTS vendors are encouraged to input into the database as much information for review consideration as applicable.

In addition to the efforts of the C-SPA, PM-CM's C-SCIM team works directly with vendors to modify existing equipment available in the commercial marketplace without significantly altering the non-governmental function or essential physical characteristics of an item(s) or component(s). C-SCIM also works to combine commercial items available to the general public to meet the specialized requirements of the Specialized CM response units with a systems-of-systems approach. This effort has established cooperative communication between government and the COTS marketplace thereby influencing commercial item development initiatives. For example, C-SCIM continues to support the development of the next generation robotic capability specifically enhanced for use by the CBD community.

Per direction of the JPEO-CBD, the C-SCIM team established and chairs the Toxic Industrial Chemical/Toxic Industrial Material (TIC/TIM) Task Force. The Task Force is developing and executing an approach to create a shared and balanced picture of the threat posed by TIC/TIMs. The products developed by the Task Force assist industry in the establishment of new materiel capabilities. This refinement of existing TIC/TIM requirements provides a link to the vendor community to ensure Specialized CM units are appropriately equipped to perform their mission. Task Force products involve TIC prioritization efforts, operational hazard and risk analyses, JPEO-CBD portfolio-wide TIC defense capability analysis and TIC test procedure development efforts. These products provide a roadmap to the emerging requirements of personal protective equipment and identification priorities utilized by industry to ensure the CBD community needs are being met.

The need for better performing and improved technology increases everyday for our Warfighters.

C-SCIM participates in technology demonstrations and operational assessments and collects feedback provided by end-users. The feedback loop shapes prototype developments and next generation capabilities with members of the commercial sector. This interdependence is critical to the Warfighter needs. It enables the DoD to be aware of what is available in the marketplace, and helps industry understand DoD requirements. The C-SCIM/Industry cooperative relationship enables rapid upgrade of existing technology and helps the commercial sector meet critical DoD needs in a more timely fashion.

PM-CM not only focuses on industry relationship and modernization of equipment for its customers, but it also works to be the "one stop shop" by providing support in the area of total lifecycle management and sustainment. The COTS Lifecycle Sustainment program is responsible for the sustainment of all COTS CBD equipment fielded to various customers. Sustainment is accomplished through a team partnership between the Tank-automotive Armaments Command (TACOM) Life Cycle Management Command (LCMC) and contractor logistic support (CLS). TACOM LCMC has a long history of providing excellent sustainment support to JPEO- CBD for CBRNe equipment. Both TACOM and the current CLS provider use an industry standard supply chain management system to ensure customer needs are maintained, thereby resulting in the ability to share relevant logistic data across the entire PM-CM customer base. Centralizing sustainment support activities provides many synergistic opportunities to leverage volume purchasing and reducing the overall logistic footprint. Sustainment considers all Integrated Logistics Systems (ILS) sustainment elements. A centralized management of fielded CBRNe COTS equipment reduces redundancy in contracts and support efforts while allowing the user organization to concentrate on their missions. Being involved in sustainment of products allows PM-CM to monitor trends in fielded equipment, which leads to better maintenance, as well as helps to identify modernization opportunities arising in Industry.

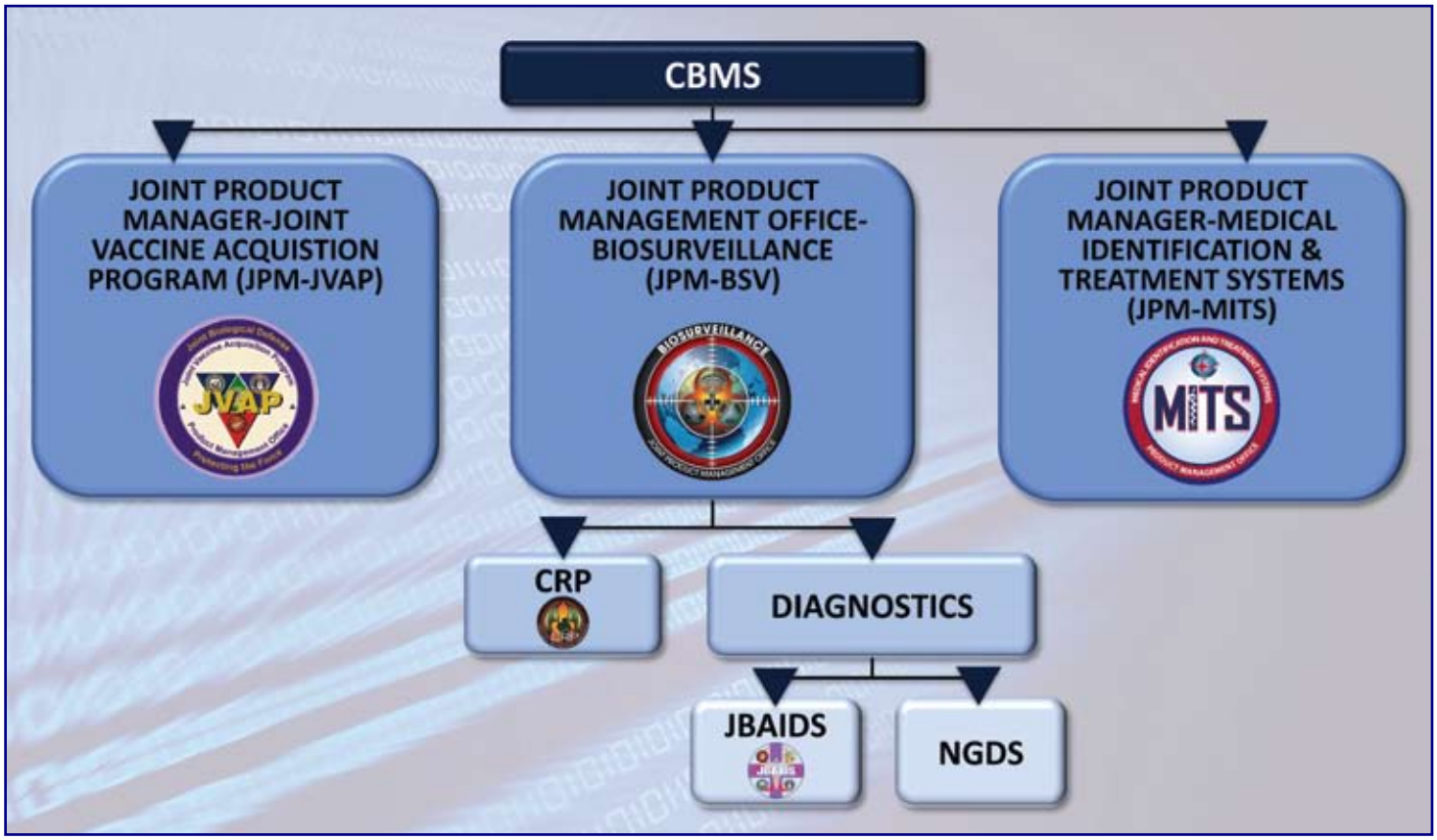
By fostering positive industry relationships, tracking trends through sustainment, and identifying modernization opportunities, the office of the Joint Product Manager Consequence Management is in a very unique position to provide the best and most rapid support to America's Warfighters tasked to combat CBRNe threats. The need for better performing and improved technology increases every day for our Warfighters. The expertise and knowledge that PM-CM has in the areas of recognizing trends, understanding and considering the needs of the Warfighter, fostering customer and industry relationships, identifying and fielding appropriate equipment rapidly to meet immediate needs as well as being able to manage and provide sustainment support makes them an invaluable resource for combating CBRNe threats alongside our soldiers. PM-CM programs result in improved relations with the COTS industry, the capabilities of the end users and savings to the DoD.


*By: Jason Roos, PhD; Jennifer McLaughlin, PMP; Margaret Holahan; Beverly Bowers, PhD*

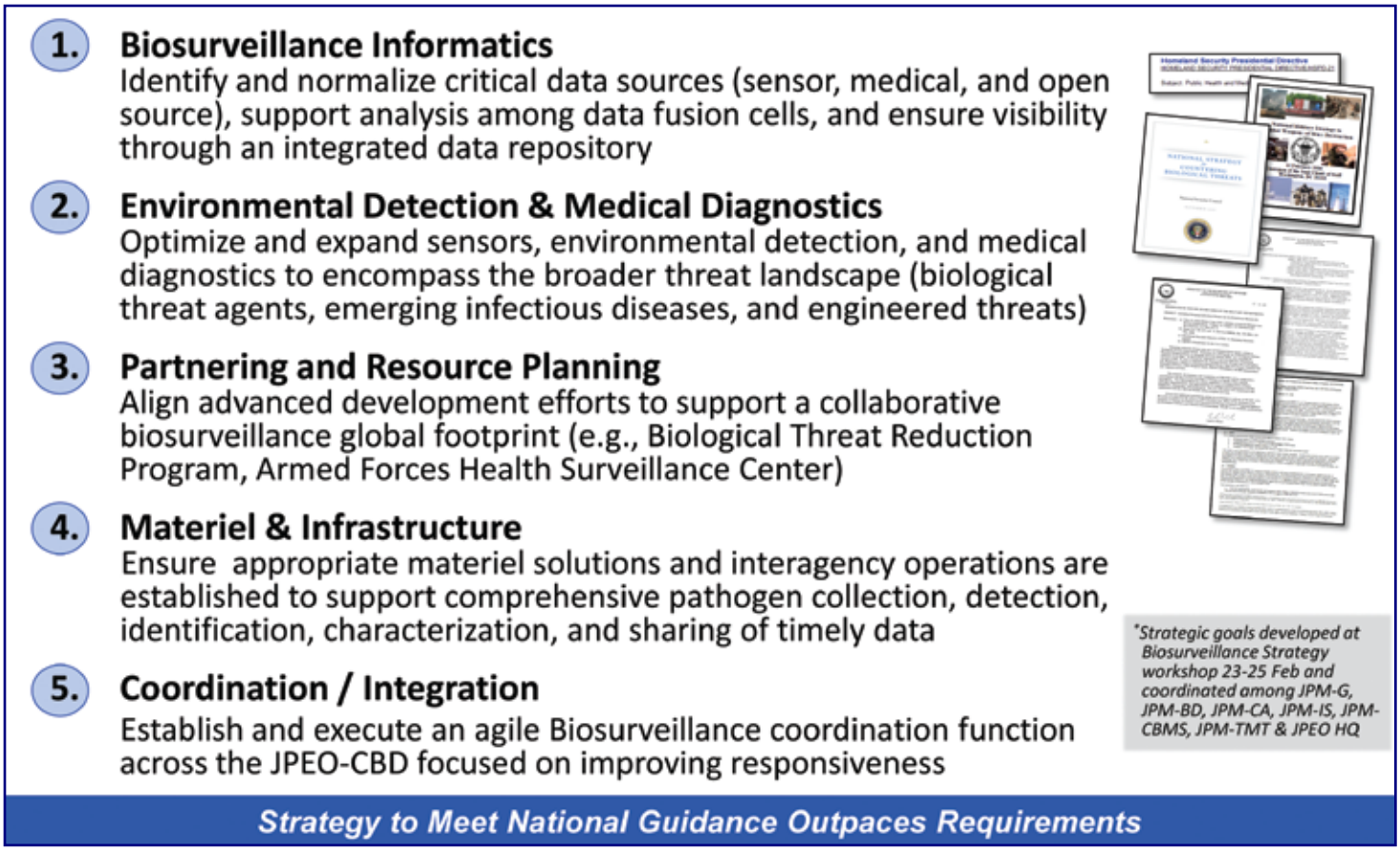
"We are launching a new initiative that will give us the capacity to respond faster and more effectively to bioterrorism or an infectious disease–a plan that will counter threats at home and strengthen public health abroad." (President Barack Obama, State of the Union Address, January 27, 2010).

Increased international attention on Biosurveillance has prompted the recent establishment of a provisional Biosurveillance office under the Joint Project Manager Chemical Biological Medical Systems (JPM-CBMS), located in Frederick, Maryland. In one of his first major efforts as the Biosurveillance Trail Boss, Col. David Williams announced the new Joint Product Management Office-Biosurveillance (Provisional) (CBMS-BSV) on February 22, 2010.

While the precise role of the trail boss within the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) enterprise is still evolving, there are five trail bosses designated to oversee and coordinate cross-cutting, enterprise-wide initiatives where an integrated chemical, biological, radiological, and nuclear (CBRN) systems solution is required. The Biosurveillance Trail Boss is responsible for integrating the JPEO-CBD Biosurveillance efforts horizontally




CBMS Organization Chart




JPEO-CBD Biosurveillance Strategic Goals

across the other Biosurveillance-focused Joint Project Managers (JPMs). Though Biosurveillance has recently come back under the microscope, it is not a brand new concept to the JPEO-CBD. Many of the JPMs already successfully perform many elements of Biosurveillance as part of the Chemical Biological Defense Mission's execution. As an example, the Joint Biological Agent Identification and Diagnostic System (JBAIDS), JPM-CBMS' deployable laboratory identification and diagnostic system, currently fields to over 300 locations across all four Services for identification of both biological warfare and infectious disease agents. Another example is the Joint Project Manager for Biological Defense's (JPM-BD) Joint Portal Shield (JPS), a sensor suite that automates detection, collection and identification of biological warfare agents, and reports this information to a centralized command post.

The new CBMS-BSV results from a number of national strategic policy documents supporting national Biosurveillance objectives. These documents include: Presidential Policy Directive-2 (PPD2), the National Military Strategy to Combat Weapons of Mass Destruction (2006), Homeland Security Presidential Directive / HSPD-21 (2007), the National Security Strategy (2009 & 2010), the National Strategy for Countering Biological Threats (2009), and the Memorandum for the Secretaries of the Military Departments: Including Emerging Infectious Disease into the Biodefense Mission Set (2009). The drive for establishing a national Biosurveillance initiative is, on many levels, from the President, the Department of Defense, the National Security Council to the Department of Health and Human Services. A common theme in these policies is the need to protect our military and civilian population from traditional, emerging and advanced biological threats, whether naturally occurring or intentional.

Operating under the definition of Biosurveillance stated in HSPD-21, the CBMS-BSV will coordinate the advanced development of products and tools across the JPEO-CBD, providing technologies and solutions to enable effective Biosurveillance. The CBMS will now consist of three subordinate joint product management offices: Medical Identification and Treatment Systems (CBMS-MITS), Joint Vaccine Acquisition Program (CBMS-JVAP), and CBMS-BSV.

Similar to all offices in CBMS, the new CBMS-BSV will integrate processes and resources to facilitate development of relevant products and tools for the Biosurveillance mission. These processes and resources include: acquisition lifecycle management, partnering for development, regulatory compliance, and planning for the future.

In late February 2010, representatives from JPEO and the Joint Science and Technology Office (JSTO) met in a three-day planning session to map out the JPEO-CBD's strategic goals for Biosurveillance. The outcome of this successful workshop yielded five strategic goals that align with the overarching JPEO-CBD mission set. These goals include: 1) Biosurveillance Informatics; 2) Environmental Detection & Medical Diagnostics; 3) Partnering and Resource Planning; 4) Materiel & Infrastructure; and 5) Coordination / Integration.

These strategic goals are the basis of the FY12-16 Program Objective Memorandum (POM) submission and are the foundation for programs and initiatives already underway.

Dr. Jason Roos, the Acting Joint Product Director of CBMS-BSV, and Ms. Jennifer McLaughlin, the Acting Joint Product Deputy Director, will add new responsibilities to their previous positions as


JPEO-CBD Programs current footprint of Biosurveillance

Director of the Critical Reagents Program (CRP) and JBAIDS System Manager, respectively. This logical progression and their extensive experience with CRP and JBAIDS program management, respectively, has prepared them for the leadership of the new CBMS-BSV, as these tools have already been used to enhance current Biosurveillance efforts. Dr. Roos and Ms. McLaughlin will incorporate the management tools of the CRP, JBAIDS, and Next Generation Diagnostic System (NGDS) into their Biosurveillance programs. Their considerable experience with the U.S. Food and Drug Administration (FDA) will also contribute with product clearance to diagnose and treat biothreat agents. The CBMS is in the best position to understand the relationship with the FDA regarding the risk involved in developing diagnostic and treatment products for the Warfighter. In addition, recent experience with the H1N1 virus (swine flu) and the Emergency Use Authorization (EUA) with JBAIDS has given insight into the use of pre-positioned data packages and pre-assembled kits for treatment of specific threat agents. These data packages and kits will save both time and money when applying for FDA-approved countermeasures after an emergency is declared.

The CBMS-BSV will work with JPMs to guide their respective Biosurveillance-related efforts across the JPEO-CBD and with Interagencies, as necessary. The CBMS-BSV is actively coordinating efforts with the following JPMs: Biological Defense, Contamination Avoidance, Guardian, Information Systems, CBMS, and Transformational Medical Technologies (TMT). For example, accomplishment of the first Strategic Goal, which focuses on Biosurveillance Informatics and is a critical piece of CBMS-BSV's efforts, hinges on the office's engagement with the JPM for Information Systems (IS). The CBMS-BSV is working hand-in-hand with the JPM-IS, as the designated Information Management/Information Technology Trail Boss, to leverage the enterprise JPM-IS is developing as a means to integrate sensors with other data feeds. This will result in an improved situational awareness and the ability to better inform commanders.

In order for the government to truly accomplish the goals of HSPD-21 and fully execute programs in alignment with the HSPD-21 definition of Biosurveillance, it will require a whole-of-government approach that includes the JPEO-CBD, DoD, Centers for Disease Control and Prevention (CDC), and other interagency organizations. As part of this outreach effort, CBMS-BSV is working with other medical organizations across the government in the spirit of maintaining the end-to-end health of our warfighters. For example, CBMS-BSV and the Office of the Assistant Secretary of Defense for Health Affairs (OASD(HA)) are currently collaborating on programs for their respective Biosurveillance-related medical efforts. These collaborative working relationships, both ongoing and newly formed, will assist in identifying and capitalizing on opportunities to work together and leverage respective resources to accomplish common goals.

On June 9, 2010, CBMS-BSV conducted a meeting that brought together more than 50 representatives from 19 organizations, including representatives from the OASD(HA)'s Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) program and the Medical Situational Awareness in Theater (MSAT) system. As a result of that meeting, the participating organizations determined a path forward for integrating DoD sensors, detectors, and diagnostics with medical surveillance systems, such as ESSENCE and MSAT. This

## Early warning could facilitate pre-symptomatic Warfighter treatment, positively impacting force readiness and preventing the spread of a contagious disease.

integration effort is of dual benefit to both OASD(HA) and the Chemical Biological Defense Program (CBDP) because it will bring disparate data feeds together to build a comprehensive, current picture of a particular community's health status. Continued alignment of programs across DoD and the Interagency, will ensure efficient work with integrated and cost effective technologies.

Ideally, accomplishing the Biosurveillance strategic goals will enable early warning of an adverse health event. Technologies such as software algorithms, next generation sensors, detectors, and diagnostics are currently in development to detect indications and warnings in advance of an event which is critical to accomplishing this overarching goal. Early warning could facilitate pre-symptomatic Warfighter treatment, positively impacting force readiness and preventing the spread of a contagious disease. In addition, it would assure key decision makers that they had the most current and most accurate information at their fingertips.

The CBMS-BSV will increase the DoD's readiness posture for emerging infectious diseases and the deliberate use of biothreat agents by planning, testing, and developing solutions that will enable Biosurveillance activities before they are actually needed. Coordinating interagency efforts in both government and civilian sectors is essential in developing and acquiring technologies and products that will allow constant vigilance and anticipating the needs of our warfighters as they put themselves in harm's way. The CBMS-BSV has the responsibility of establishing productive contributions and excellent teamwork among agencies and to develop technologies for biothreats detection in alignment with the National Strategy for Countering Biological Threats. Biosurveillance is critical in protecting both the Warfighter and the Nation in the 21st Century.

***HSPD-21 Biosurveillance Definition:*** *The term 'biosurveillance' means the process of active data-gathering with appropriate analysis and interpretation of biosphere data that might relate to disease activity and threats to human or animal health - whether infectious, toxic, metabolic, or otherwise, and regardless of intentional or natural origin - in order to achieve early warning of health threats, early detection of health events, and overall situational awareness of disease activity.*

**Contact Information: CBMS-BSV, 301.619.7400, Frederick, MD.**


Biosurveillance: A whole-of-government approach.

# ECBC Cooperative Research and Development Agreements

*Interview by: Joe Cartelli*

The Edgewood Chemical and Biological Center (ECBC) has developed and managed multiple Cooperative Research and Development Agreements (CRADAs) to collaborate with private industry on research and development activities in the area of Chemical and Biological Defense (CBD). In the past, ECBC and their industrial partners exchanged intellectual property, expertise and data to accomplish the work under the agreement.

ECBC has signed and maintains several CRADAs with both small businesses to large companies. Areas of collaboration range from product engineering to scientific studies, and these CRADA have accomplished notable work for the CBD mission.

Recently, I had a chance to speak with Mr. Dhirajlal Parekh, Chief of the ECBC Technology Transfer (T2) Office, who has supported the ECBC T2 program for many years.

**Joe Cartelli: What is your definition of a Cooperative Research and Development Agreement?**

Dhirajlal Parekh: This is a joint research collaboration between Government agency and industry to join their resources to solve a difficult technical issue in which both parties use each other's resources such as lab space, lab equipment and labor.

**Joe Cartelli: For how many years have Cooperative Research and Development Agreements (CRADAs) been in place at ECBC?**

Dhirajlal Parekh: Twenty years. ECBC entered into its first CRADA in March 1990 with the Dow Corning Corporation.

**Joe Cartelli: How much time does it take to get a Cooperative Research and Development Agreement in place?**

Dhirajlal Parekh: usually 30 days or less.

**Joe Cartelli: How many active CRADAs does ECBC manage that support the Chemical and Biological Defense mission?**

Dhirajlal Parekh: The vast majority of ECBC's CRADAs support the Chemical and Biological Defense (CBD) mission. As of the beginning of FY10, ECBC had a total of 62 active CRADAs. Of the 18 new CRADAs signed by ECBC in FY09, 15 support the CBD mission. So far in FY10, six CRADAs have been written/signed with another seven pending and more expected. Technology Transfer (T2) continues to be a robust program at ECBC.

**Joe Cartelli: How does the collaboration between industry and the ECBC project officers work?**

Dhirajlal Parekh: This happens two ways. Sometimes ECBC Scientists and Engineers approach us and sometimes industry approaches us. Both the technical aspects of the R&D collaboration under a CRADA and the project management aspects are defined and agreed upon by the parties in a CRADA Joint Work Statement (JWS). There is considerable flexibility in drafting a JWS. Per the CRADA statute (15 USC 3710a), the industry collaborator can contribute funding, personnel, services, and property. The Government (ECBC in this case) can contribute personnel, services, and property. Funding from the government to the collaborator is not allowed as CRADAs are not procurement or acquisition contracts (and not subject to the FAR and DFARS). There must be a Research and Development (R&D) aspect to a CRADA, but the JWS is not limited just to R&D or to a specific level of R&D. In addition, there must be some level of collaboration between the parties. That is, it is not appropriate to use a CRADA in a purely fee-for-services type of arrangement.

**Joe Cartelli: What tangible benefits have these CRADAs had for DoD?**

Dhirajlal Parekh: These collaborative agreements have provided DoD access to new technology efforts which could not be funded solely by the government or industry. By providing industry and academic institutions access to ECBC's unique capabilities, including its highly skilled workforce and specialized laboratories, millions of dollars have been saved. In some cases, duplication of these capabilities in the private or academic sectors, such as work with agents, is not feasible because of public safety concerns. In addition, these CRADAs allow for the acceleration of Technology Readiness Levels (TRLs) beyond what is generally possible in a purely government-funded approach by taking advantage of industry investments.
For example, one of ECBC's licensees (Genencor Inc.) was able to produce a commercially available product in 18 months of signing a license and CRADA with ECBC. The ECBC senior scientist who invented the technology estimated that it would have taken years to do the same using the normal technology development and acquisition process.

**Joe Cartelli: What were the two best known or productive CRADAs between industry and the ECBC supporting the Chemical and Biological Defense mission?**

Dhirajlal Parekh: ECBC has many productive CRADAs with industry. Two recent and noteworthy CRADAs are with iRobot for the UGV and General Dynamics Armament and Technical Products (GDATP) for the TAC-BIO. In both of these CRADAs, the private sector partner is accelerating the fielding of the ECBC-invented technology for the benefit of both military and civilian end-users. These CRADA collaborations effectively leverage the broader market base created by Homeland Security needs in which state and local first responders can benefit from and purchase the improved technology as well as the military.

**Joe Cartelli: How does industry or a DoD lab start a CRADA?**

Dhirajlal Parekh: The best way to start is to contact the cognizant Technology Transfer (T2) Office, which in the federal laboratory community is also referred to as the Office of Research and Technology Applications (ORTA). ECBC's T2 Office can be reached by calling 410-436-4438. The staff is well versed in all aspects of CRADA formation and execution.
This July, ECBC nominated its Technology Transfer (T2) Office for the George Linsteadt award. This award recognizes the extraordinary efforts of individuals who facilitate the transfer of technology from the DOD to the private sector. Mr. Dhirajlal Parekh summarized his feelings about this achievement with the following: "The ECBC has gained many awards and accolades over the years, but I am highly encouraged to see ECBC's effort to facilitate Technology Transfer being honored for its contribution to industry and the sciences".
The ECBC's Technology Transfer efforts have greatly advanced research and development in Chemical and Biological Defense mission area. Through the dozens of it active CRADAs, ECBC has afforded its scientist, and those from industry, a unique and powerful venue for collaboration. Yet service to the community may be the greatest legacy of ECBC's many CRADAs, given that technologies expressly developed for DoD, may now be shared and find new life in a multitude of new products for the benefit of humanity.


# *"The Reason for Our Success is Our People."*